DOCUMENT RESUME

ED 292 847 TM 011 227

AUTHOR Schunk, Dale H.; Hanson, Antoinette R.
TITLE Self-Modeling and Cognitive Skill Learning.
PUB DATE Aug 87
NOTE 27p.; Paper presented at the Annual Meeting of the American Psychological Association (New York, NY, August 28-September 1, 1987).
PUB TYPE Reports - Evaluative/Feasibility (142) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC02 Plus Postage.
DESCRIPTORS *Classroom Techniques; Cognitive Development; Elementary Education; Elementary School Students; Grade 3; Grade 4; Modeling (Psychology); *Problem Solving; *Self Evaluation (Individuals)

ABSTRACT

This experiment investigated self-modeling among 60 children, enrolled in grades 3 and 4, during cognitive skill learning. Children received training on addition and subtraction of fractions. Subjects in one condition (mastery self-model) were videotaped while successfully solving problems and viewed their tapes. Children in the progress self-modeling group were videotaped while learning fraction operations and subsequently viewed their tapes. These subjects experienced initial difficulties, but eventually were successful. Other children were videotaped, but did not view their tapes. Subjects in the fourth condition received training, but were not videotaped. Children in the mastery and progress self-model conditions demonstrated higher self-efficiency, skill, and training performance, compared with subjects in the other two conditions. The mastery and progress treatments did not differ in their effects on children's perceptions of progress in learning. (Author/TJH)

****
* Reproductions supplied by EDRS are the best that can be made *
* from the original document. *
****

Self-Modeling and Cognitive Skill Learning

Dale H. Schunk

University of North Carolina - Chapel Hill

Antoinette R. Hanson

University of Houston

ED292847

U.S. DEPARTMENT OF EDUCATION
Office of Educational Research and Improvement
EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)

X This document has been reproduced as received from the person or organization originating it.

☐ Minor changes have been made to improve reproduction quality.

• Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

DALE SCHUNK

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

Paper presented at the meeting of the American Psychological Association, New York, August 1987.

TM 011 227

BEST COPY AVAILABLE

Abstract

This experiment investigated self-modeling among children during cognitive skill learning. Children received training on addition and subtraction of fractions. Subjects in one condition (mastery self-model) were videotaped while successfully solving problems and viewed their tapes. Progress self-model children were videotaped while learning fraction operations and subsequently viewed their tapes. These subjects experienced initial difficulties but eventually were successful. Other children were videotaped but did not view their tapes, and subjects in a fourth condition received training but were not videotaped. Children in the mastery and progress self-model conditions demonstrated higher self-efficacy, skill, and training performance, compared with subjects in the other two conditions. The mastery and progress treatments did not differ in their effects on children's perceptions of progress in learning.

Self-Modeling and Cognitive Skill Learning

Self-modeling refers to behavioral change that derives from observing oneself on videotapes portraying only desired target behaviors (Dowrick, 1983; Hosford, 1981). The videotapes can capture existing behaviors - such as when subjects role play or masterfully perform previously learned skills - or can portray artificially created behaviors with editing and illusory techniques (e.g., by deleting errors or using a camera angle that obscures aid from others). Self-model tapes have been effectively employed to train physical, vocational, communication, and social-personal skills (Davis, 1979; Dowrick & Dove, 1980; Dowrick & Hood, 1981; Dowrick & Raeburn, 1977; Hosford & Mills, 1983; Miklich, Chida, & Danker-Brown, 1977).

From a theoretical perspective, self-modeling may occur partly due to an enhanced sense of perceived self-efficacy, or personal beliefs about one's capabilities to organize and implement actions necessary to attain designated levels of performance (Bandura, 1982, 1986; Schunk, 1985). Self-efficacy is hypothesized to affect choice of activities, effort expenditure, and persistence. Individuals acquire information about their self-efficacy from their performance accomplishments, vicarious (observational) experiences, forms of persuasion, and physiological indexes (e.g., heart rate, sweating). Observing oneself performing well on videotape is a vicarious source of efficacy information and conveys that one has acquired skills, which can engender the belief among observers that they are capable of further learning. In turn, higher self-efficacy can enhance motivation and lead to greater skill improvement.

The purpose of the present study was to study self-modeling among children during cognitive skill learning. Children received training on

addition and subtraction of fractions. Some subjects were videotaped while successfully solving problems and subsequently viewed their tapes (mastery self-model). Other children were videotaped but did not view their tapes, and subjects in a third condition received training but were not videotaped. Based on the preceding considerations, we expected that the self-model treatment would lead to the highest self-efficacy and skillful performance.

We also explored the effects of a progress self-model treatment. Some children were videotaped while learning how to solve fraction problems. These subjects experienced some initial difficulties but progressed to where they eventually performed as well as subjects in the mastery self-model treatment. In school, children often experience initial difficulties in learning cognitive skills. As originally conceptualized (Dowrick, 1983; Hosford, 1981), self-model tapes portray no errors. We felt that the behavioral sequence portrayed in the progress self-model tapes would bear a closer resemblance to school learning than that depicted in the mastery tapes.

We expected that the progress self-model treatment would promote achievement behaviors as well as the mastery treatment. Recording subjects' performances and subsequently showing them their tapes can produce salutory effects on behaviors and self-perceptions (Hung & Rosenthal, 1981), but research also has yielded no benefits and negative effects (Bailey & Sowder, 1970; Brown, 1980; Fuller & Manning, 1973; Martin, 1971; Trower & Kiely, 1983). Hosford (1981) suggested that individuals who already perceive themselves as competent in the skills being portrayed are apt to benefit from self-observation, whereas those who doubt their capabilities to begin with may experience lower self-concepts as a result of viewing their tapes. When subjects perceive no improvement in their behaviors or receive no information

on how to perform more productively, observing one's errors or maladaptive behaviors may not be beneficial (Griffiths, 1974; Hung & Rosenthal, 1981).

Perceived progress is an important cue used to assess self-efficacy (Schunk, 1985). Individuals who believe that they are improving are apt to experience heightened self-efficacy for learning, which can enhance motivation and skill development. In addition, the distinction between our self-model treatments is similar to that between mastery and coping models in therapeutic contexts (Meichenbaum, 1971). Coping models initially demonstrate the typical fears and deficiencies of observers but gradually improve their performances and gain self-confidence, whereas mastery models demonstrate faultless performance from the outset (Kazdin, 1978; Kornhaber & Schroeder, 1975; Thelen, Fry, Fehrenbach, & Frautschi, 1979). Research shows that coping models produce behavioral change as well as or better than mastery models (Jaffe & Carlson, 1972; Klorman, Hilpert, Michael, LaGana, & Sveen, 1980; Kornhaber & Schroeder, 1975; Meichenbaum, 1971). In achievement contexts, Schunk and Hanson (1985) found that observing either a peer mastery or coping model learn subtraction skills enhanced children's achievement behaviors. A subsequent study showed that observing a single peer coping model learn to solve fractions promoted children's self-efficacy and skills better than observing a single mastery model, but there were no differences when multiple models were portrayed (Schunk, Hanson, & Cox, in press).

Within this context, we investigated whether boys and girls reacted differently to the two self-model treatments. Although there is some evidence that children may attend to different aspects of same-sex models (Bussey & Bandura, 1984), individuals are more interested in self-portrayals than in those of others (Fuller & Manning, 1973). In mathematics, boys often expect

to perform better than girls, but consistent differences do not emerge until junior high school (Meece, Parsons, Kaczala, Goff, & Futterman, 1982). Schunk and Hanson (1985) and Schunk et al. (in press) reported no sex differences among elementary school children due to variations in modeling. Accordingly, we did not expect to find sex differences among our elementary-age subjects as a function of self-model treatment.

Method

Subjects

The final sample comprised 60 third and fourth graders drawn from one elementary school. Ages ranged from 8 years 7 months to 11 years 5 months (M = 10.2 years). The 30 boys and 30 girls represented various socioeconomic backgrounds but were predominantly middle class. Ethnic composition of the sample was as follows: 68% white, 14% black, 10% Hispanic, 8% Asian.

Subjects had been classified by the school district as working on grade level in mathematics. At the time of the study, subjects had received minimal instruction on fractions in their classes. School personnel originally nominated 68 students for inclusion in the study. Eight students were excluded from this sample: Problem solving behaviors of three students did not match their treatment assignments (discussed in Results), two were absent and missed some of the training sessions, and three were randomly excluded from the appropriate cells to equalize cell sizes.

As part of the school district's regular testing procedure, all students had previously been administered the Iowa Tests of Basic Skills (Hieronymus, Lindquist, & Hoover, 1978). The ITBS mathematics total score, which comprises concepts, computation, and problem solving, was available for each subject.

Materials and Procedure

Pretest. The pretest on fractions self-efficacy and skill was administered to children individually by one of four female adult testers drawn from outside the school. Testers followed a standardized set of instructions. The self-efficacy test assessed children's perceived capabilities for correctly solving different types of fraction problems. For this assessment, 31 scales were portrayed on six sheets of paper. Each scale ranged in 10-unit intervals from not sure (10), through intermediate values (50-60), to really sure (100). The stimulus materials comprised 31 sample pairs of fraction problems; each pair appeared on an index card. The two problems constituting each pair were similar in form and operations required, and corresponded to one problem on the skill test although they involved different numbers. The reliability of this measure was assessed in conjunction with previous research (Schunk et al., in press). The test-retest reliability coefficient was .79.

Children initially received practice with the self-efficacy scale by judging their certainty of successfully jumping progressively longer distances. In this concrete fashion, children learned the meaning of the scale's direction and the different numerical values. Following this practice, children were briefly shown the 31 sample pairs of problems for about 2 s each. This duration allowed assessment of difficulty but not actual solutions; children judged their capability for solving different types of problems rather than their certainty of solving any particular problem. The tester advised children to be honest and to mark the efficacy value that corresponded to their level of certainty for correctly solving the type of problem depicted. After privately making each judgment, children covered it

with a blank sheet of paper to preclude effects due to observing prior judgments. The 31 scores were summed and averaged.

The fractions skill test was administered immediately following the efficacy assessment. This test comprised 31 problems that tapped addition and subtraction as follows (examples in parentheses): addition, like denominators, no carrying (1/6 + 4/6); addition, like denominators, carrying (9/10 + 5/10); addition, unlike denominators, no carrying (5/16 + 2/4); addition, unlike denominators, carrying (11/15 + 37/45); subtraction, like denominators, no regrouping (7/9 - 3/9); subtraction, unlike denominators, no regrouping (21/36 - 8/18). Of these 31 problems, 21 were similar to those that children solved during the training and videotape sessions, whereas the other 10 were more complex. For example, during training students solved problems with two terms, whereas some skill test problems included three terms (1/3 + 2/12 + 1/4). Different forms of the skill test were used on the pretest and posttest to eliminate potential effects due to problem familiarity. Reliability was assessed in conjunction with the Schunk et al. (in press) study; the parallel forms r was .90.

Each of the 31 problems was portrayed on a separate sheet of paper. The tester presented problems to children one at a time, and verbally instructed students to examine each problem and to place the page on a completed stack when they finished solving the problem or chose not to work on it any longer. Children were given no performance feedback on the accuracy of their solutions. The measure of skill was the number of problems solved correctly.

Training sessions. Following the pretest, children were randomly assigned within sex and grade to one of six treatment conditions: mastery self-model (boys), mastery self-model (girls), progress self-model (boys),

progress self-model (girls), videotape control, instructional control. Equal numbers of boys and girls were assigned to each of the latter two conditions.

All children received the fractions training program during 40-min sessions on six school days. Six sets of instructional material were used. Each set incorporated one of the six fractions operations described above (skill test). The first page of each set contained a full explanation of the relevant operation, along with two examples illustrating application of the solution strategy. The following pages each contained several similar problems to be solved using the designated strategy. Students worked on one set during each training session. Each set included sufficient problems so that children could not complete all of them during the session.

Training sessions were conducted by one of four female adult proctors drawn from outside the school. For any given child, the same proctor administered all training sessions, had not administered his or her pretest, and was unaware of his or her experimental assignment. At the start of each session, children met in small groups with their proctor. The proctor initially reviewed the explanatory page by verbalizing aloud the solution steps and their application to the sample problems. Following this instructional phase (about 5 min), children solved two practice problems in the proctor's presence. The proctor stressed the importance of performing the steps as shown on the explanatory page, seated subjects at desks separated from one another, and moved out of sight. Children solved problems alone during the remainder of the session (about 30 min). If they were baffled on how to solve a problem they could consult the proctor who reviewed the troublesome operation.[1]

Videotape session. Children assigned to one of the four self-model conditions or to the videotape control condition were videotaped on the day following the fourth training session. This point gave children experience in working fractions but also allowed potential motivational effects of self-modeling to occur in subsequent training sessions. On the day of videotaping, children participated in a 40-min training session during which they worked on instructional material that addressed addition of mixed numbers with and without carrying (e.g., 5 4/7 + 7; 4 5/8 + 2/8; 5 4/6 + 1 1/6; 10 8/9 + 9 7/9). These types of problems were not included in the fractions training program, but there were three problems with mixed numbers on the skill test.

During this 40-min session, each child was individually escorted to a private room by a female adult proctor who had not served as his or her tester. All work was done on white poster boards with a large black felt pen to permit easier viewing. The camera was positioned about 10 ft away and was operated by an adult male experimenter who had not participated in the testing or training sessions. Each child was videotaped solving 12 problems (about 12-15 min). Problems involved addition of mixed numbers with carrying (e.g., 7 9/11 + 3 9/11). The proctor wrote the first problem on the board and asked the child to verbalize aloud while solving it so that verbalizations could serve as additional self-model cues. If children were unsure of what to do or made an error, the proctor responded with a prompt or provided corrective instruction. The proctor also prompted children if they failed to verbalize aloud. When the child finished solving the first problem, the proctor provided performance feedback (e.g., "That's correct"), and wrote the next problem on the board. This sequence continued throughout the videotaping. Proctor and child were recorded on tape while the proctor wrote problems on

the board or gave corrective feedback; only the child was recorded while he or she was solving a problem.

Mastery and progress self-model conditions were distinguished by the timing of videotaping. Progress self-model subjects were videotaped during the first half of this training session, which meant that they were learning how to solve fractions with mixed numbers while they were being videotaped. Mastery self-model subjects were videotaped during the second half of this session; thus, problem solving during videotaping was actually a review because they had solved comparable problems during the first half of the special session. Half of the children assigned to the videotape control condition were videotaped during the first half of the special session and the other half were videotaped during the second half. Children assigned to the instructional control condition worked on the same instructional material during this session but were not videotaped. They were told that they would be videotaped after the project was completed. We followed this procedure because the opportunity to be videotaped is valued by children and we did not want instructional control subjects to become discouraged, which might have adversely affected their performances during the remainder of the project.

Viewing session. Each self-model subject viewed his or her videotape the next day in a private room with only the proctor present. The proctor did not comment while the tape was showing except to acknowledge any remarks made by children. On completion of the videotape, children were administered a measure of perceived progress. This 10-unit scale ranged in 10-unit intervals from not better (10), through a little better (40) and much better (70), to a whole lot better (100). Children were asked to think about their problem solving on the tape and judge how good they were in working fractions compared

with when the project began. This measure was collected to determine if self-model conditions exerted differential effects on children's perceived progress in learning.

On the day that self-model children viewed their tapes, videotape and instructional control subjects worked in their regular classes (not on fractions). These children were administered the perceived progress measure to control for potential effects due to assessing progress. The progress measure has no other relevance for children in these conditions, and will not be discussed further. Videotape control subjects viewed their videotapes on the day following the posttest. Instructional control subjects viewed their videotapes on the day following their videotaping (after the posttest).

Posttest. Children received the posttest 1-2 days after the last training session. For any given child, the tester was unaware of the child's experimental assignment and of how the child had performed during training. The self-efficacy and skill instruments and procedures were identical to those of the pretest except that the parallel form of the skill test was used. Tests and training materials were scored by an adult who had not participated in the data collection and was unaware of children's experimental assignments.

Results

Experimental Assignment Check

We determined whether children's videotaped problem-solving behaviors matched their experimental assignments by having the videotapes scored for conceptual errors by an adult who had not participated in the data collection. Conceptual errors included instances of children not knowing how to solve a problem (e.g., asking the proctor for assistance) or performing an erroneous operation, such as adding denominators of fractions. The criteria for

inclusion were no conceptual errors for mastery self-model subjects and no conceptual errors during the second half of the problem solving (i.e., last six problems) for progress self-model subjects. This latter criterion still allowed six problems on which children could display mastery. Using these scoring criteria, two children were dropped from the mastery self-model treatment and one child was excluded from the progress self-model condition. The mean numbers of conceptual errors made were: 3.8 - progress self-model boys, 4.3 - girls, 2.5 - videotape control ($F(2, 27) < 1$).

Means and standard deviations of all measures are presented by experimental condition in Table 1. Preliminary analyses of variance (ANOVAs) yielded no significant between-conditions differences on pretest measures (self-efficacy, skill). There also were no significant differences on any measure due to tester or classroom.

Insert Table 1 about here

Self-Efficacy and Skill

Intracondition changes (pretest to posttest) on each measure were evaluated using the *t* test for correlated scores (Winer, 1971). All six conditions showed significant increases in self-efficacy and skill from pretest to posttest (*ps* < .01 except *p* < .05 for instructional control subjects on self-efficacy).

Posttest self-efficacy and skill were analyzed with a multivariate analysis of covariance (MANCOVA) using the corresponding pretest measures as covariates. The six conditions constituted the treatment factor. This analysis was significant, Wilks's lambda = .452, $F(10, 102) = 4.97$, $p < .001$.

Univariate analyses of covariance (ANCOVAs) revealed significant main effects on self-efficacy, $F(5, 53) = 8.66$, $p < .001$ ($MS_e = 90.47$); and skill, $F(5, 53) = 8.49$, $p < .001$ ($MS_e = 11.87$). Means of the six conditions were evaluted using Dunn's multiple comparison procedure (Kirk, 1982). These analyses yielded no significant differences between the mastery self-model (boys), progress self-model (boys), mastery self-model (girls), and progress self-model (girls) conditions; however, each of these conditions demonstrated significantly higher posttest self-efficacy and skill than did the videotape control and instructional control conditions (self-efficacy ps $< .05$ except $p < .01$ for the mastery self-model (boys) - videotape control and mastery self-model (boys) - instructional control comparisons; skill ps $< .01$ except $p < .05$ for the progress self-model (boys) - instructional control and progress self-model (girls) - instructional control comparisons). The videotape and instructional control conditions did not differ significantly from one another on either measure.

Training Performance

The number of problems that children completed during the fractions training program was analyzed with ANOVA to determine whether experimental conditions exerted differential effects on children's motivation. The six conditions constituted the treatment factor. This analysis was significant, $F(5, 54) = 11.17$, $p < .01$ ($MS_e = 226.75$). Dunn's procedure showed that the four self-model conditions did not differ but that each solved significantly more problems than did the videotape and instructional control conditions (ps $< .01$). More rapid problem solving was not attained at the expense of accuracy; similar results were obtained using the proportion of problems that

subjects solved correctly (total number correct divided by total number completed) as the measure of training performance.

To further explore variations in problem solving, we separately analyzed the number of problems that children completed during the four training sessions prior to videotaping and the two sessions following videotaping. Analysis of the former measure was nonsignificant, $F(5, 54) < 1$. ANOVA applied to the latter measure yielded a significant result, $F(5, 54) = 14.93$, $p < .01$ ($MS_e = 167.25$). Dunn's multiple comparison procedure showed that the four self-model conditions did not differ, but that each completed significantly more problems than did the videotape control and instructional control conditions ($ps < .01$). The latter two conditions did not differ from one another. Similar results were obtained using the proportion of problems solved correctly as the measure of training performance.

Perceived Progress

The perceived progress measure was analyzed using only scores from the four self-model conditions. ANOVA yielded a nonsignificant result, $F(3, 36) < 1$. Inspection of Table 1 shows that children's mean scores on this measure were near 70 (much better) on the scale, which demonstrates that children believed that they had made progress in learning.

Standardized Mathematical Score

To determine whether experimental conditions were equated in mathematical competencies, we analyzed children's mathematics total score from the ITBS. ANOVA yielded a nonsignificant result, $F(5, 54) < 1$.

Correlational Analyses

Product-moment correlations were computed among posttest self-efficacy, posttest skill, training performance (number of problems completed), and

perceived progress. For correlations involving the latter measure, only the scores of subjects assigned to the self-model conditions were employed. All correlations were significant ($p < .01$). The more problems that children completed during the training program, the higher were their posttest self-efficacy ($r = .56$) and skill ($r = .62$) scores. Self-efficacy and skill bore a positive relationship to one another, $r = .71$. Among self-model subjects, perceived progress in learning was significantly related to training performance ($r = .42$), self-efficacy ($r = .48$), and skill ($r = .54$).

Discussion

The results of this study support the idea that viewing a self-model tape can promote children's achievement behaviors during cognitive skill learning. Children who observed their own successful problem solving demonstrated higher training performance, posttest self-efficacy, and posttest skill, compared with children who were videotaped but did not observe their tapes and those who only received the instructional program. Observing oneself performing well can serve as a vicarious source of self-efficacy information and convey that one has acquired skills. Self-efficacy for continued learning subsequently is validated as children solve problems, and can lead to further skill development (Schunk, 1985).

As Dowrick (1983) notes, however, the benefits of viewing a self-model tape may occur due to an enhancement of self-beliefs or from providing information about how to perform skills. Videotaped feedback has both an informational and a motivational function (Griffiths, 1974). The present study cannot disentangle these functions, because self-model children might have reviewed fraction operations while watching their videotapes. Nonetheless, the amount of skills information acquired while watching tapes

likely was minimal; all children assigned to self-model conditions previously had demonstrated mastery in working fractions while being videotaped. Dowrick (1983) cites evidence that observing a self-model tape can exert motivational effects even when the tape portrays erroneous skills information. Future research might include a condition in which all proctor feedback was deleted from videotapes prior to children observing them so that children could not be certain that their problem solving was successful.

We want to emphasize, however, that self-modeling alone was not responsible for the gains in children's achievement behaviors. Self-model tapes were used in conjunction with a training program that included instruction and student practice. In the absence of an instructional program, viewing a self-model tape should not have much effect on self-efficacy and skillful performance; children would have to determine on their own how to solve problems. Similarly, Hung and Rosenthal (1981) found no support for independent benefits of videotaped feedback in therapeutic contexts; rather, its effectiveness depended on the presence of a comprehensive treatment program.

No differences were obtained on any measure between the mastery and progress self-model conditions. These treatments differed in important ways, but they both portrayed successful problem solving, which can raise self-efficacy (Bandura, 1986). Although children assigned to the progress self-model treatment also viewed some errors, the perception of progress is an important cue used to assess self-efficacy (Schunk, 1985). The belief that one is making progress seems exceptionally important in school, where learning often is characterized by initial difficulties.

We do not wish to suggest that showing errors in learning is necessarily desirable. There is much evidence that portraying errors can have deleterious effects on some subjects (Bailey & Sowder, 1970; Trower & Kiely, 1983), especially those who already hold negative self-beliefs (Hosford & Mills, 1983). From a self-efficacy perspective, subjects who perceive little or no progress in learning are likely to believe that they are not capable of improving very much (Schunk, 1985). When errors in one's performances are portrayed, they need to be used as the basis for progress in learning or be accompanied by information on how to perform more productively (Dowrick, 1983).

There were no significant differences between boys and girls on any experimental measure. Although boys often to expect perform better in mathematics than do girls, this difference typically does not emerge until the junior high school years (Meece et al., 1982). That children generally are interested in observing themselves on videotape likely negated any possibility of boys and girls attending to differential aspects of the tapes (Dowrick, 1983).

Consistent with previous similar research (Schunk & Hanson, 1985; Schunk et al., in press), the present study supports the idea that self-efficacy is not merely a reflection of prior performances. Children assigned to the progress self-model and videotape control conditions did not differ in their problem solving while being videotaped, but the former subjects developed higher self-efficacy. The perception of progress is an important cue used to gauge self-efficacy (Schunk, 1985). This study also shows that capability self-perceptions bear a positive relationship to subsequent achievement. Personal expectations for success are viewed as important influences on

behavior by a variety of theoretical approaches to achievement (Bandura, 1986; Corno & Mandinach, 1983; Covington & Beery, 1976; Weiner, 1985).

These results have implications for educational practice. Videotaping occurs often in schools, yet mastery self-model tapes are difficult to make. Few teachers possess the time or skills required for editing. Alternatively, teachers can select a task that either children already can perform or ought to learn without making any errors, in which case self-modeling likely is unnecessary. Children who already are competent at a task ought to feel efficacious, and the immediate performance successes on easy tasks should enhance self-efficacy. Progress self-model tapes, which more accurately reflect much school learning, seem well suited for promoting children's self-efficacy and are easier to make. Teachers need to select a task that children may be expected to learn while being taped. In short, the portrayal of oneself acquiring skills is seen as a useful adjunct to a sound instructional program in developing children's skills and self-efficacy for applying them.

References

Bailey, K. G., & Sowder, W. T., Jr. (1970). Audiotape and videotape self-confrontation in psychotherapy. Psychological Bulletin, 74, 127-137.

Bandura, A. (1982). Self-efficacy mechanism in human agency. American Psychologist, 37, 122-147.

Bandura, A. (1986). Social foundations of thought and action. Englewood Cliffs, NJ: Prentice-Hall.

Brown, S. D. (1980). Videotape feedback: Effects on assertive performance and subjects' perceived competence and satisfaction. Psychological Reports, 47, 455-461.

Bussey, K., & Bandura, A. (1984). Influence of gender constancy and social power on sex-linked modeling. Journal of Personality and Social Psychology, 47, 1292-1302.

Corno, L., & Mandinach, E. B. (1983). The role of cognitive engagement in classroom learning and motivation. Educational Psychologist, 18, 88-108.

Covington, M. V., & Beery, R. G. (1976). Self-worth and school learning. New York: Holt, Rinehart & Winston.

Davis, R. A. (1979). The impact of self-modeling on problem behaviors in school-age children. School Psychology Digest, 8, 128-132.

Dowrick, P. W. (1983). Self-modelling. In P. W. Dowrick & S. J. Biggs (Eds.), Using video: Psychological and social applications (pp. 105-124). Chichester, England: Wiley.

Dowrick, P. W., & Dove, C. (1980). The use of self-modeling to improve the swimming performance of spina bifida children. Journal of Applied Behavior Analysis, 13, 51-56.

Dowrick, P. W., & Hood, M. (1981). Comparison of self-modeling and small cash incentives in a sheltered workshop. Journal of Applied Psychology, 66, 394-397.

Dowrick, P. W., & Raeburn, J. M. (1977). Video editing and medication to produce a therapeutic self model. Journal of Consulting and Clinical Psychology, 45, 1156-1158.

Fuller, F. F., & Manning, B. A. (1973). Self-confrontation reviewed: A conceptualization for video playback in teacher education. Review of Educational Research, 43, 469-528.

Griffiths, R. D. P. (1974). Videotape feedback as a therapeutic technique: Retrospect and prospect. Behaviour Research and Therapy, 12, 1-8.

Hieronymus, A. N., Lindquist, E. F., & Hoover, H. D. (1978). Iowa Tests of Basic Skills. Chicago: Riverside Publishing Company.

Hosford, R. E. (1981). Self-as-a-model: A cognitive social learning technique. The Counseling Psychologist, 9(1), 45-62.

Hosford, R. E., & Mills, M. E. (1983). Video in social skills training. In P. W. Dowrick & S. J. Biggs (Eds.), Using video: Psychological and social applications (pp. 125-150). Chichester, England: Wiley.

Hung, J. H., & Rosenthal, T. L. (1981). Therapeutic videotaped playback. In J. L. Fryrear & B. Fleshman (Eds.), Videotherapy in mental health (pp. 5-46). Springfield, IL: Thomas.

Jaffe, P. G., & Carlson, P. M. (1972). Modelling therapy for test anxiety: The role of model affect and consequences. Behaviour Research and Therapy, 10, 329-339.

Kazdin, A. E. (1978). Covert modeling: The therapeutic application of imagined rehearsal. In J. L. Singer & K. S. Pope (Eds.), The power of human imagination: New methods in psychotherapy (pp. 255-278). New York: Plenum Press.

Kirk, R. E. (1982). Experimental design: Procedures for the behavioral sciences (2nd ed.). Belmont, CA: Brooks/Cole.

Klorman, R., Hilpert, P. L., Michael, R., LaGana, C., & Sveen, O. B. (1980). Effects of coping and mastery modeling on experienced and inexperienced pedodontic patients' disruptiveness. Behavior Therapy, 11, 156-168.

Kornhaber, R. C., & Schroeder, H. E. (1975). Importance of model similarity on extinction of avoidance behavior in children. Journal of Consulting and Clinical Psychology, 43, 601-607.

Martin, R. D. (1971). Videotape self-confrontation in human relations training. Journal of Counseling Psychology, 18, 341-347.

Meece, J. L., Parsons, J. E., Kaczala, C. M., Goff, S. B., & Futterman, R. (1982). Sex differences in math achievement: Toward a model of academic choice. Psychological Bulletin, 91, 324-348.

Meichanbaum, D. (1971). Examination of model characteristics in reducing avoidance behavior. Journal of Personality and Social Psychology, 17, 298-307.

Miklich, D. R., Chida, T. L., & Danker-Brown, P. (1977). Behavior modification by self-modeling without subject awareness. Journal of Behavior Therapy and Experimental Psychiatry, 8, 125-130.

Schunk, D. H. (1985). Self-efficacy and classroom learning. Psychology in the Schools, 22, 208-223.

Schunk, D. H., & Hanson, A. R. (1985). Peer models: Influence on children's self-efficacy and achievement. Journal of Educational Psychology, 77, 313-322.

Schunk, D. H., Hanson, A. R., & Cox, P. D. (in press). Peer model attributes and children's achievement behaviors. Journal of Educational Psychology.

Thelen, M. H., Fry, R. A., Fehrenbach, P. A., & Frautschi, N. M. (1979). Therapeutic videotape and film modeling: A review. Psychological Bulletin, 86, 701-720.

Trower, P., & Kiely, B. (1983). Video feedback: Help or hindrance? A review and analysis. In P. W. Dowrick & S. J. Biggs (Eds.), Using video: Psychological and social applications (pp. 181-197). Chichester, England: Wiley.

Weiner, B. (1985). An attributional theory of achievement motivation and emotion. Psychological Review, 92, 548-573.

Winer, B. J. (1971). Statistical principles in experimental design (2nd ed.). New York: McGraw-Hill.

Footnote

[1]Of the 60 students in the final sample, 10 consulted the proctor at various times during the training program; they were proportionately distributed throughout the treatment conditions.

Table 1

Means (and Standard Deviations) by Experimental Condition

		Experimental Condition					
		Mastery Self-Modeling		Progress Self-Modeling		Videotape	Instructional
Measure	Phase	Boys	Girls	Boys	Girls	Control	Control
Self-Efficacy (Average judgment per problem; 10 (low) - 100)	Pretest	52.3 (21.2)	46.7 (19.8)	46.8 (28.3)	48.0 (17.3)	45.4 (21.2)	52.5 (15.4)
	Posttest	89.7 (5.1)	81.6 (11.2)	82.1 (9.0)	82.2 (12.1)	66.8 (12.9)	68.3 (12.4)
Skill (Number of correct solutions on 31 problems)	Pretest	4.4 (5.3)	5.2 (2.3)	3.8 (3.0)	4.0 (2.7)	4.2 (2.4)	3.9 (3.0)
	Posttest	15.3 (5.5)	14.6 (3.7)	14.2 (4.4)	13.9 (4.4)	7.8 (3.1)	8.7 (2.1)
Training Performance (No. of problems completed)	---	178.8 (28.8)	183.9 (10.0)	182.4 (12.5)	178.3 (14.1)	156.1 (17.0)	151.3 (16.4)
Perceived Progress (10 (not better) - 100 (a whole lot better))	---	77.0 (16.4)	69.0 (21.8)	68.0 (17.5)	68.0 (16.2)	---	---
Standardized Math Score (ITBS Percentiles)	---	86.4 (12.8)	79.5 (20.5)	79.2 (15.4)	77.2 (11.1)	85.1 (10.0)	81.0 (13.1)

Note. N = 60; n per condition = 10.